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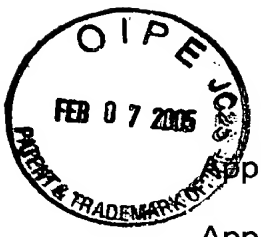

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 09/124,925 Group Art unit: 1745

Applicant: Koichi ASHIZAWA et al. Examiner: T. Dove

Filed: July 29, 1998 Attorney Docket: ASHI3001/FJD

Title: (As Amended) Current collector with penetrating holes of complicated shape for use in a secondary battery and manufacturing process thereof

RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Notification of Non-Compliance with 37 CFR 1.192(c) dated January 7, 2005 has been received.

In the Notification, it is stated that (1) ". . . the brief does not contain a statement of the status of each . . . amendment . . .," and (2) ". . [t]he brief does not contain a concise statement of the issues presented for review . . .".

In reply to (1), a corrected copy of the Brief on Appeal, filed on April 2, 2001; exclusive of attachments, is being submitted herewith to correct the Status of Amendments section to reference the Advisory Action dated December 18, 2000. The copy of the Brief on Appeal is presented in accordance with the procedure in effect at the time that the Brief on Appeal was originally filed.

In reply to (2), it is noted that the Brief on Appeal filed on April 2, 2000 does include a section headed Issues, which identifies two issues on appeal, namely the issue involving the rejection of claims 1, 2 and 4 as indefinite, and the issue involving the rejection of claims 1, 2 and 4 as unpatentable under 35 U.S.C. § 103(a) over Jenkins.

The first issue argued includes a discussion of the term "complicated" and the completeness of claim 4, which the second issue includes a discussion of the rejections over Jenkins.

The final rejection of June 1, 2000 included an objection to the specification because the amendment filed 3/7/00 introduced "new matter into the disclosure,: namely "the insertion of "or irregular" on page 3, line 19. In the REQUEST FOR RECONSIDERATION WITH AMENDMENT filed on December 1, 2000 there was included an amendment to page 3 deleting the insertion of "or irregular." This amendment returned the specification to its condition as filed. The Advisory Action of December 18, 2000 refers to the amendments to the claims and not to the specification. It was assumed, therefore, that the amendment to page 3, line 19 deleting "or irregular" was acceptable, thereby obviating the need to identify the objection to the specification as an issue. In any event, objections are not appealable.

The final rejection of June 1, 2000 also included a rejection of claims 1, 2 and 4 under 35 USC 112, first paragraph because of the addition of the "term non-regular...to claim 1." In the REQUEST FOR RECONSIDERATION WITH AMENDMENT, claim 1 was amended to delete "non-regular" and return to "complicated" which is the term used in the application as filed. The Advisory Action of December 18, 2000 states "Re-adding the term ["complicated"] would require the examiner to reinstate the rejection of claims 1, 2 and 4." What rejection? It was assumed to be the rejection under 35 USC 112, second paragraph found on page 4 of the Office Action of October 7, 1999, since this rejection involves the term "complicated."

The final rejection of June 1, 2000 also included a rejection of claim 4 under 35 USC 112, second paragraph because it was "incomplete," and because of the term "given pressure." In the REQUEST FOR RECONSIDERATION WITH AMENDMENT, claim 4 was amended to delete "given." In the Advisory Action of December 18, 2000 the examiner discussed the "concavo-convex" feature in claim 4 not the deletion of the term "given." It was assumed, therefore, that the deletion of the term "given" was acceptable as it eliminated an issue.

The final rejection of June 1, 2000 also included a rejection of claims 1, 2 and

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under 35 USC 103(a) over Jenkins. In the REQUEST FOR RECONSIDERATION WITH AMENDMENT this rejection was addressed.

A consideration of the final rejection of June 1, 2000 as discussed above demonstrates that there really are three points of contention: 1) whether the term "complicated" (as originally filed) is definite; and 2) whether claim 4 is complete; and 3) the art rejection.

In the Brief on Appeal filed April 2, 2001 points 1) and 2) were joined as issue (1) and point 3) as issue (2). Both issues were argued.

It is respectfully submitted that the ISSUES section and the ARGUMENT section of the Brief on Appeal are proper. Still, if the examiner sees the issues as being different, applicant/appellant is prepared to address any issue that the examiner believes should be included in a supplemental brief.

Date: February 7, 2005

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Koichi Ashizawa et al — Art Unit: 1745

Appln. No. : 09/124,925 — Ex: T. Dove

Filed July 29, 1998

For Current collector with penetrating holes of complicated shape for use in a secondary battery and manufacturing process thereof (as amended)

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22202-3514

Sir:

Pursuant to the provisions of 37 CFR 1.192, submitted herewith is Applicant/Appellants' Brief on Appeal.

REAL PARTY IN INTEREST

The real party interest, that is the party that holds the entire right, title and interest in this application is the assignee, Nippon Foil Manufacturing Co., Ltd.

RELATED APPEALS AND INTERFERENCES

No appeal or interference is pending in any related application.

STATUS OF CLAIMS

Claims 1, 2 and 4 are finally rejected. No claims are allowed.

STATUS OF AMENDMENTS

The final rejection was on June 1, 2000. A Request for Reconsideration with Amendment and a Notice of Appeal was filed on December 1, 2000. In the amendment, claim 1 was changed to replace "non-regular" to "complicated." This was

because the examiner held the change of "complicated" to "non-regular" as introducing "new matter" into the application.

The amendment to claim 1 was not entered as indicated in the Advisory Action issued December 18, 2000.

SUMMARY OF THE INVENTION

(page and line references are to the specification)

The present invention relates to a current collector for use in a secondary battery (pg. 1, lines 6 and 7). When coating a surface of a metal foil, such as aluminum foil or copper foil with active material, the metal foil and the active material are difficult to integrate or attach to each other, with the active material dropping out relatively easily. In the preparation of a secondary battery, if a part of the active material, drops out at the time of winding then positive electrode and the negative electrode, there arises a problem of not being able to obtain a secondary battery of a desired capacity. If a part of the active material drops out after the preparation of the secondary battery, there arises another problem that the charge and discharge capacity of the secondary battery is gradually reduced. (pg 1, lines 24 and 25, to pg 2, lines 1-11).

The present invention effectively prevents the active material from dropping out by improving the adherence between each periphery or each inner wall of the penetrating holes and the active material (pg 3, lines 12-15). The current collector according to the present invention is provided with penetrating holes of complicated shape. The invention also relates to a method of producing the current collector (pg 3, lines 20-22).

The current collector according to the present invention satisfies a set of expressions (pg 4, lines 2-4). When these expressions are satisfied, the penetrating holes have no burrs. According to the method, a metal foil is passed between a concavo-convex roll and a smoothing roll under a predetermined pressure. The holes are formed at the given pressure by the plurality of convex parts on the concavo-convex roll. The metal foil with the holes is then passed between a pair of metal smoothing rolls to remove the burrs. (pg 7, lines 24 and 25 to pg 8, lines 1-25).

ISSUES

There are two issues in this appeal, namely, (1) are claims 1, 2 and 4 unpatentable under 35 USC 112, second paragraph as indefinite because of the term "complicated;" and (2) are claims 1, 2 and 4 unpatentable under 35 USC 103(a) over Jenkins.

GROUPING OF THE CLAIMS

Claims 1 and 4 are in independent form, while claim 2 is dependent on claim 1. Claims 1 and 2 are directed to the novel current collector, and claim 4 is directed to the method for producing the current collector.

ARGUMENT

(1)

The term "complicated" is definite and in full compliance with the requirements of 35 USC 112 and claim 4 is complete.

The metallic foils according to the present invention serve as current collectors in, for example, a lithium secondary battery or a lithium-ion battery. The foil desirably has holes (penetrating holes) which penetrate the foil. The hole can have a smooth

surface defining its perimeter or it can have a surface which is not smooth. The term used to describe the "not smooth" surface was originally "complicated." This term was found by the examiner to be objectionable because "[c]omplicated generally means difficult and it is unclear what a complicated or difficult shape encompasses." (Page 4, of the Office Action of October 7, 1999.). To overcome the objection, "complicated" was modified in the specification to "complicated or irregular," and to "non-regular" in claim 1. These modifications, it was believed, would clarify any confusion, which apparently it did not. Still, the condition of "irregular" or "non-regular" is, it is respectfully submitted, clearly shown in Figs 1 and 2, even if it is found nowhere else.

The examiner in the latest Office Action takes the position that "or irregular" in the specification is objectionable, and "non-regular" in claim 1 is rejectable. This leaves applicant with no place to go, except back to "complicated," since, presumably, the illustration in Figs 1 and 2 is not supportive, which in fact they are.

Also, the term "complicated" means more than that which the examiner expresses as her understanding. The term "complicated" could mean "difficult" as suggested by the examiner, and such a meaning would not lend much to and understanding of the surface under consideration. However, "complicated" also means "having many interconnected parts," or "marked by an interrelation of diverse and often numerous parts..." (Webster's Third New International Dictionary, page 465, copy enclosed). Considering these definitions, lends more meaning to the concept of the shape of the surface defining the holes. Couple this with Figs. 1 and 2 and, it is respectfully submitted, no confusion should exist.

It is respectfully submitted, therefore, that the term "complicated" should be accepted if "irregular" is not. In either case, those skilled in the art should have no difficulty in understanding what is intended.

To understand claim 4, reference is made to Japanese patent 3-13926. A copy of this patent and an English language abstract are being submitted herewith. Note Fig. 2 of this patent which shows the roll 3 penetrating the foil 1 to form holes. The roll 3 corresponds to a concavo-convex roll like that used in the present invention. All that is needed is rotation if the roll is configured as a concave-convex roller.

(2)

Claims 1, 2 and 4 patentably distinguish over Jenkins

Claim 1 defines a current collector with very specific parameters, namely, two equations which must be satisfied to define the surface shape of the penetrating holes. If these equations are not disclosed in Jenkins et al, it is not seen how Jenkins et al can render claim 1 unpatentable. Jenkins et al has no reason to even contemplate the noted equations, because their holes do not have a complicated or irregular shape. Nor is it proper to suggest that Jenkins et al would contemplate the two equations because they are made with a punch die and not a concavo-convex roller.

A reference which teaches a plate with punched holes is not sufficient, it is respectfully submitted, to render a foil with a plurality of penetrating holes satisfying two specific equations, obvious.

Regarding claim 4, it is the convex parts that create the penetrating holes, and the penetrating holes are those defined in claim 1. Claim 4 is therefore a product-by-process claim and as such enjoys the distinctions noted above relative to

claim 1. Jenkins et al. cannot render claim 4 unpatentable in the same way that it cannot render claim 1 unpatentable. Also, Jenkins et al. does not teach the step of passing the metal foil with the penetrating holes formed therein "further through between a pair of metal smoothing rolls" for the purpose of de-burring the penetrating holes at their periphery.

SUMMARY

The use of the term "complicated" is not indefinite since it is described along with the term "irregular," and because as shown and described those skilled in the art would have not difficulty in understanding what is intended.

The Jenkins et al. patent does not teach the claimed relationships recited, nor the convex parts that create the penetrating holes.

Accordingly, the Board should remand this application to the examiner with a finding that claims 1, 2 and 4 are allowed.

Respectfully submitted,

Date: February 7, 2005

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APPENDIX

1. A current collector for use in a secondary battery consisting of a metal foil provided with a plurality of penetrating holes, each of which has a complicated shape without burrs and satisfies the following expressions:

$$0.05 \leq S \leq 50$$

$$1.30 \leq M/N \leq 100$$

where: S is an area expressed in mm^2 of the penetrating hole, M is a peripheral length expressed in mm of the penetrating hole, and N is a peripheral length expressed in mm of a virtual circle having the area S of the penetrating hole.

2. A current collector for use in a secondary battery according to claim 1, wherein the thickness of the metal foil is in the range of 5 to 100 μm.

4. A method for producing the current collector of claim 1 for use in a secondary battery, comprising the steps of: passing a metal foil without a hole through between a concavo-convex roll having a plurality of convex parts and a smoothing roll under pressure; converting thereby portions of the metal foil without a hole and pressed by the convex parts of the concavo-convex roll into portions with penetrating holes; and passing the metal foil with the penetrating holes further through between a pair of metal smoothing rolls, whereby burrs produced at each periphery of the penetrating holes are removed.